Oscillans pedunculus florum glaber, 13-57 mm longus. Flores florentes 10 Junius ad 10 Julius in puberulis pedicellis in plerumque 7-9-floridis cymis, 6-7(-10) mm lati, 5-9 mm alti, poculoformes. Sepala lanceolata, 3-3.6 mm longa, 1.5-2 mm lata. Petala oblonga aut oblonga-lanceolata, 4-5 mm longa, 1-1.5 mm lata. Staminodia lanceolata, 2-3 mm longa. Stamina 1-2 mm longa. Antherae flavae aut luteo-flavae. Pistillum 4.6 mm longum, anthesi conclusum, maturatione producens ad 6 mm.

Fructus maturescens et plerumque cadens ex 13 Julius ad 1 Augustus, globosus aut subglobosus, cinereus aut viridi-brunneus tomentulosus, (3-)5-7 mm diametro, raro subglobosus et 9 mm lato tenus; exocarpos .5-1 mm densus; semen 1, raro 2, 3.5-4.8 mm longum, 3.5-4 mm latum, raro 5 mm longum et tum intra endocarpon conclusum.

Holotypus: US.

TILIA RELICTA LAUGHLIN

A cylindric tree, tapering at the top, with a tall straight trunk and numerous slender horizontal branches, slightly drooping at the ends, attaining a diameter of 102 cm, a hight of 34 m and an age of 360 years. Bark dark gray, flat and smooth, on trees more than 13 cm in diameter becoming separated into vertical segments about 1 cm wide with fissures .2-.8 cm wide. Last year's branchlets glabrous, usually greenish brown or light grayish brown, occasionally reddish brown, 1.5-2.5 mm thick. Crown terminal winter buds 1-6, 2.5-5 mm long, ovoid, lustrous reddish brown, glabrous.

Blades of mature crown leaves 7.2-15.5 cm long, 5.5-11.5 cm wide, thin, most commonly cordate, occasionally ovate or orbicular, with a base usually cordate or obliquely cordate and acuminate apex, usually serrate with broad teeth with a tip less than 1 mm long, usually dull dark yellow green above, paler and dull beneath, glabrous above, glabrous, tufted with minute axillary hairs or stellate puberulent beneath. Blades of young unfolding crown leaves dark greenish yellow, glabrate above, tomentulose beneath, with puberulent petioles. The angle between the pair of primary veins emerging at the base of the blade and the midrib ranges from 38° to 51°.

Petioles of mature crown leaves 3.1-5.3 cm long, slender, angled, glabrous. Stipules chartaceous, 7-8 mm long, 2-5 mm wide, oblong, caducous.

The inflorescence, terminal or axillary, consists of a bract, swinging peduncle, pedicels and flowers, which comprize 5 sepals, 5 petals, 4 or 5 staminodia, numerous stamens, and 1 pistil. Bract usually sessile or subsessile, rarely with a stalk 5-8 mm long, glabrous, usually oblong, obtuse at apex, narrowed at base, 47-122 mm long, 13-30 mm wide. Swinging peduncle of flowers glabrous, 13-57 mm long. Flowers blooming June 10 to July 10 on puberulous pedicels in usually 7-9-flowered cymes, 6-7(-10) mm wide, 5-9 mm high, bowl-shaped. Sepals lanceolate, 3-3.6 mm long, 1.5-2 mm wide. Petals oblong or oblong-lanceolate, 4-5 mm long, 1-1.5 mm wide. Staminodia lanceolate, 2-3 mm long. Stamens 1-2 mm long. Anthers yellow or orange yellow. Pistil 4.6 mm long, included in anthesis, lengthening to 6 mm in maturation.

Fruit ripening and usually falling from July 13 to Aug. 1, globose or subglobose, gray or greenish brown tomentulose, (3-)5-7 mm in diameter, rarely subglobose and up to 9 mm wide; exocarp .5-1 mm thick; seed 1, rarely 2, 3.5-4.8 mm long, 3.5-4 mm wide, rarely 5 mm long and then enclosed within endocarp.

DISCUSSION

Whittington Park, in the northwest part of the city of Hot Springs, Arkansas, is an east-west park about 1000 yards long and 200 feet wide. The west fork of Hot Springs Creek flows thru the middle of it. The north and south roadways of Whittington Avenue border the park. Whittington Park has been a part of the Hot Springs National Park for more than fifty years. The area commonly understood to be the Hot Springs National Park is the mountainous area south of Whittington Park.

Whittington Park contains a colony of 19 Basswoods of a unique species, upon which I am bestowing the name Tilia relicta. These trees are arranged in a row on each side of the creek. Their linear arrangement and orderly spacing look artificial, but the information given me by the Chief of Maintenance is convincing that none of these trees were planted

and that their arrangement near the creek is a consequence of the microclimate. T. relicta is a monotopic species confined to Whittington Park.

A map of Whittington Park accompanies this article. I have given numbers to these 19 Basswoods. #1 is in the northeast corner of the colony and I am designating this tree as the type tree of the new species. The numbers run west along the north side of the creek and then east on the south side of the creek.

T. relicta is the most magnificent and perfectly shaped deciduous tree that I have ever seen. The leader goes straight up, undaunted by overtopping foliage of Sycamores or other trees. The slender limbs spred out horizontally and complete the design of a tall, symmetric tree. The trunk is perfectly round and the flat, smooth bark is different from the furrowed bark of other species of Tilia and different from anything that I have ever seen except Red Ash.

The largest of these 19 Basswoods is more than twice as big as any of the other 18 trees. This tree, No. 6 on the accompanying map, is about 50 feet north of the creek and 175 feet west of West Mountain Drive, which crosses the park. This tree, which I shall call "The Monarch," is now 10 feet 4 inches in circumference, 3 feet 4 inches in diameter and 93 feet tall. I mesured the hight of this tree with an Abney level 6 Dec. 1954 and found it was 111 feet tall. In the late 1960's the leader died, probably having been struck by lightning, and it was cut off. The leader is growing again, but of course the tree is not as tall as it once was. This tree has been shown in the American Forestry Association's champion tree list as "Florida Basswood, Tilia floridana," for many years.

I have taken mesurements of the circumference of this tree for 22.3 years. The growth rate during this period, shown in Table 1, indicates that this tree is 346 years old.

About ten years ago a tornado moving southwest passed over this colony. During the last 57 years five tornadoes have passed thru Hot Springs. At this rate, it can be estimated that The Monarch has survived thirty tornadoes without injury.

Relicta has a remarkable stout and expansive horizontal root system, extending as much as ten feet from the trunk in all directions. None of these trees could ever be uprooted in a storm.

Some twenty years ago I corresponded with various authorities in efforts to identify The Monarch. I had no knowledge of the flowers at that time and my material was nearly all leaves. Consequently the results were somewhat uncertain. I was groping around at that time, trying to hook up this tree with something that had been described. After moving to Hot Springs in 1969, studying the trees in the colony thruout the year and getting adequate material for identification, I became convinced that they represented an undescribed species. I show below references to correspondence for the benefit of those persons that may wish to review the correspondence; these references may also be useful to locate the specimen of relicta in the herbarium, where it might have been labeled floridana, nuda or leucocarpa.

Lily M. Perry's letter of 7 Jan. 1950.
William A. Dayton's letter of 1 Mar. 1950, file RD Dendrology Identification Tilia.
Dwight M. Moore's letter of 24 June 1954.
G. N. Jones's letter of 13 Apr. 1960.

Table 1, Morphology of Tilia, herein shows the characters of Tilia relicta, americana L., caroliniana Mill., caroliniana var. rhoophila Sarg. and floridana Small. The figures shown are averages except those referenced "@" and "*." This table is of extreme importance in distinguishing the respective species.

The characters of relicta shown in Table 1 represent averages or actual mesurements of the 19 trees in the colony and not merely the type tree. The terminal winter buds are an average of 14 specimens from 7 trees. They wither away rapidly after the twigs are cut and herbarium specimens should not be used for a description. The dimensions of the leaves and petioles are an average of specimens from 9 trees. Number of flowers, peduncle and tract are an average of many inflorescences with flowers from 6 trees that bloomed in 1971.

The dimensions and characters of the leaves and petioles (vegetative) of americana var. americana in

Table 1 represent averages of 22 specimens collected by me from 19 localities in five states, viz: Warren Woods (Mich.), Ind. Dunes, Turkey Run (Ind.), Labagh Woods, Chechupinqua, River Grove, Miami Woods, W. Riverside Woods, Black Partridge Woods, White Pines, Brownfield Woods (Ill.), Swope Park, Mt. Washington Woods, Van Meter, Meramec, Bennett Spring, Roaring River (Mo.), Buffalo River and Delzie Demaree's #61784 from Fiftysix (Ark.). The dimensions of the flowers and fruits are taken from collections that I made in the Chicago region and Swope Park in 1951-1959.

The dimensions and characters of caroliniana var. caroliniana in Table 1 apply to the AFA champion at Bard Spring on Blaylock Creek in Polk County in the Ouachita National Forest of Arkansas with the exception of the fruit, which I have not seen. I collected leaves 12 Sep. 1970 and leaves and flowers 24 June 1971. This tree has a circumference of 3 feet 6 inches and a hight of 64 feet. I have taken the description of the fruit from Sargent's Manual of the Trees of North America. The diameter of the fruit shown therein, 1/8 inch, 3 mm, is also shown by Harrar & Harrar, Vines and Brockman for this species.

The dimensions and characters of caroliniana var. rhoophila in Table 1 are taken from 12 specimens collected in Glenwood and Bard Spring in 1939-1958.

There are two columns of data for floridana in Table 1. The first column shows the characters described for the species in Sargent's "Manual of the Trees of North America" and the second column shows the characters described in J. K. Small's "Manual of the Southeastern Flora" (1933); except that the figures preceded by an asterisk (shown in both columns) were furnished by Professor Ronald L. McGregor of the University of Kansas in his letter 3 July, 1972 and represent mesurements of an isotype of T. floridana Small from Jackson County, Florida in their herbarium.

The last line in Table 1 shows the growth rates of three taxa. The figures are the average annual increment in inches of the circumference of the trunk mesured at 54 inches above the ground over a period of years. The figure for americana is the average of three trees in Indiana, Illinois and Missouri. The latter tree, in Wildcat Hollow, Swope Park, Kansas City, Mo., has an annual growth rate of .66 inch with,

a record of 28.8 years and is 156 years old. The figure on caroliniana var. rhoophila is based on a 7 year record of a tree on the Caddo-River at Glenwood, Ark., which was broken off in a storm in 1950. The equivalence of the growth rates of americana and caroliniana var. rhoophila, .57 inch, may be slightly coincidental, but the growth rate of relicta, .36, which is that of The Monarch, is much less.

In choosing material of americana in Table 1 I have refrained from using leaves in the Kansas City area of the type described as T. palmeri Bush ex F. C. Gates in Kan.Acad.Sci.Trans. 42:135. Mention is made on pages 45, 61 and 62 of G. N. Jones's Taxonomy of American Species of Linden, Ill.Biol.Mon. 39, of a similar type described as T. velutina Mackenzie ex V. Engler and T. americana var. vestita (A. Braun) V. Engler. The leaves of this type are thicker and smaller than americana, unsymmetrically subcordate at the base, coarsely serrate, scabridulous above, pale or glaucous and never lustrous beneath with conspicuous cross-veins, and the left and right primary veins do not leave the midrib at the same point. Plate 4, page 125 of Jones's monograph, shows typical leaves of palmeri. Further study, particularly of the parts of its flowers, is needed to determine where it belongs.

Table 2 shows in the last two columns for americana and floridana percentages reflecting the differences between the figure in Table 1 for americana or floridana and the figure shown in Table 1 for relicta. The percentages are arrived at by ascertaining the difference between the figure for relicta and the figure for americana or floridana in Table 1 and dividing this figure by the figure for americana or floridana in Table 1.

For example, Table 1 shows that the length of the petiole divided by the length of the blade of relicta is .39; of americana, .46; of floridana, .26. .46 minus .39 equals .07. .07 divided by .46 equals 15%. .39 minus .26 equals .13. .13 divided by .26 equals 50%.

At the bottom of Table 2 there are totals of figures in the two columns where there are figures on the same line in both columns. These figures represent the accumulated differences of characters between relicta on the one hand and americana and floridana on the other hand. The totals, 192 for americana and 339 for floridana, show that relicta is much

more closely related to americana than to floridana.

Some of the resemblances of relicta to americana are rather striking, such as the shape of leaf blades and base, angle of primary veins at base, and number of flowers to a bract.

In the Pleistocene epoch Tilia and other northern genera were forced southward. Tilia of this epoch prefers a northern climate, and after the ice sheets retreated and the climate warmed up, americana spred out in the North; but in the South Tilia was able to survive only under exceptionally favorable conditions. The condition in the Ouachita Mountain Region of Arkansas is an east-west valley north of a mountain range. Whittington Park is such; Bard Spring on Blaylock Creek is another.

My opinion is that the prototype of relicta was americana or its progenitor. The relationship of relicta to americana is mathematically substantiated by Table 2 and the totals at the bottom of the table. I assume that americana or its prototype was common in the Hot Springs area in the Pleistocene epoch; but after the climate warmed up americana or its prototype moved northward. Only the colony in Whittington Park remained. During the past hundred thousand years the population of relicta has been isolated from other Basswoods and has developed in orthogenetic evolution to produce the present species. Bees diligently serve the flowers of Tilia, and cross-pollination has effectively homogenized the characters of relicta's population.[1]

The southern boundary line of the range of americana is accurately shown on page 48 of Jones's monograph. The point on this boundary line that is closest to Hot Springs is approximately the town of Fiftysix, Arkansas, in Stone County in the Ozark National Forest 110 miles distant from Whittington Park. This colony of relicta is therefore 110 miles distant from the range of americana.

The keen sensitivity of americana to the microclimate of its habitat and its reliance thereon for survival are mentioned on page 694 of Agriculture Handbook 271, Silvics of Forest Trees. The restricted habitat of relicta strikingly displays its reliance on microclimate. These trees are confined to a distance of fifty feet from the west fork of Hot

Springs Creek and no trees can be found outside Whittington Park. Local authorities say that the temperature in Whittington Park is about ten degrees cooler than in the surrounding mountains. This microclimate accounts for the survival of relicta.

Relicta does not sucker like americana. #6 and #11 are the only trees that send out suckers at the base. The sprout leaves and crown leaves are not significantly different.

In 45% of my specimens of leaves of americana the undersurface is lustrous. The undersurface of the leaves of relicta is never lustrous.

The following Table shows the variations in serration and pubescence of the undersurface of the leaf blades of ten trees of relicta.

TABLE SHOWING VARIABLE CHARACTERS OF THE LEAF BLADES OF INDIVIDUAL TREES OF TILIA RELICTA

TILIA RELICTA	SERRATION	SHAPE OF BASE	PUBESCENCE OF UNDERSURFACE	
			MIDRIB	PARENCHYMA
#1	Remotely crenulate serrulate	Obliquely cordate	Stellate puberulent	Stellate puberulent
#2	Serrate with short broad teeth	Obliquely cordate	Glabrous	Stellate puberulent
#4	Do.	Cordate	Glabrate	Glabrous
#6	Do.	Obliquely cordate	Axillary tufts	Glabrous
#7	Do.	Cordate	Axillary tufts	Glabrous
#10	Do.	Obliquely cordate	Glabrous	Glabrous
#11	Do.	Obliquely truncate	Glabrous	Glabrous
#13	Do.	Cordate	Glabrous	Glabrate
#14	Do.	Cordate	Axillary tufts	Glabrous
#17	Do.	Cordate	Axillary tufts	Stellate puberulent

The undersurface of the leaf blades may be glabrous or stellate pubescent or have minute tufts of axillary hairs. These variations show how absurd has been the practice of botanists for two hundred years in classifying the species of Tilia by the hairs on the undersurface of the leaves.

Taxonomists of Tilia must come to realize (1) that the pubescence of the undersurface of the leaf blades is a trivial and variable character and of no significant diagnostic value in distinguishing the

glabrate species; (2) that the flowers are as important as in Crataegus and the parts of fresh flowers must be mesured; and (3) that the definitive mesurement of other organs should be the average of mesurements of a considerable number of typical and well developed pieces of each organ.

The glabrate species of Tilia should be distinguished by substantial characters, such as bark, twigs, winter buds, leaves, flowers and fruit.

The flowers of Tilia should be studied and dissected in the laboratory because of the difficulty of examining such crowded flowers in the field. Even tho excruciatingly difficult, each of the sepals, petals, staminodia, stamens and pistil, crowded together in a space less than a centimeter wide, must be mesured in a fresh flower. First the sepals are mesured and then clipped off; the petals are mesured and then clipped of; and so on. The flowers wilt fast, even under refrigeration, and they should be dissected within 48 hours after being plucked. Herbarium specimens are worthless for accurate study.

The high chromosome number of Tilia, 41, indicates the existence of many diagnostic characters.

The latest opus on Tilia that I have seen is George Neville Jones's "Taxonomy of American Species of Linden (Tilia)," published by the University of Illinois Press as Illinois Biological Monograph 39 in 1968. On page 31, in comparing paleobotanists with neobotanists, he says, "Study of living trees in the field will not alter these conditions," i.e., herbarium specimens, and "It would appear that in this respect the neotaxonomist studying contemporary floras often has only a slight advantage over his paleobotanical colleagues." This sounds like a demonstration of meagerness in his material. Table 1 herein shows 34 characters useful in identification, some of which must be ascertained from material collected very recently.

Jones unites floridana with caroliniana and states on page 93 that floridana is indistinguishable from caroliniana. Table 1 herein shows that in 13 cases the characters of floridana differ from caroliniana var. caroliniana by more than 8%.

Jones disregards eight glabrate species in the South described by Sargent.

I accept no part of Jones's taxonomy of Tilia. In the first place, there is nothing to show that he studied Southern species; on page 31 he spurns the idea. In the second place, he bases his classification on pubescence, a trivial and variable character of no diagnostic value in distinguishing the glabrate species of Tilia. In the third place, the range of dimensions of organs in the description of his collective species caroliniana on page 86 is in some cases less than the dimensions of the AFA champion at Bard Spring. In the fourth place, in his determination to wipe out the Southern entities he has ignored distinctive characters, such as the lobed leaves of texana Sarg. In the fifth place, his union of floridana with caroliniana is untenable for many reasons.

Discrepancies between Jones's mesurements and the dimensions of the AFA champion at Bard Spring are shown in the following table.

	TILIA CAROLINIANA VAR. CAROLINIANA	
	JONES	AFA CHAMPION
Length of winter buds mm	3-4	6.5
Length of petioles cm	2-4	5-7.5
Hight of flowers mm	6-7	8.5-10
Length of sepals mm	4-5	5-7
Length of petals mm	5-6	6-7
Length of staminodia mm	4-5	5-6.5

Jones's monograph contains list of thousands of specimens examined by him but the names given to the material by the collectors are not shown. To explain his method, on page 2 praises C. R. Ball's "centripetal" method, where "the specimens should be sorted out by geographical areas without regard to the names which have been applied to them previously." If I were an inveterate collector, I would resent the author's idea of changing my identification of the material to conform to his idea of what should grow

in that locality if I thought I knew more about it than he did.

Relicta differs from mexicana as described on page 98 of Jones's monograph in being larger, bark not furrowed, flowers smaller, bracts and peduncle glabrous, pedicels puberulous, sepals, petals, staminodia, pistils and fruit smaller.

Efforts to make the genus Tilia monotypic in the United States, as was done by George K. Brizicky in Journ.Arn.Arb. 46:291.1965, are too crude to be accepted by thorogoing taxonomists. Brizicky did not show that he studied any trees in the field. Certainly no one should unite species unless he has studied in the field both species as originally described, examined the flowers and mesured their parts and has convinced himself that the two species are identical.

Even if there be a continuum between americana, caroliniana and floridana, the characters of these species shown in Table 1 are distinctive enough to justify their recognition as distinct species.

Britton & Shafer in "North American Trees" state that the fruit of floridana is 5-6 mm in diameter. Sargent in "Manual of the Trees of North America" says it is ½ inch (13 mm) in diameter. One of them must be wrong.

I hypothetize a herbarium sheet correctly labeled floridana with fruit 6 mm in diameter, perhaps immature. A superficial worker, an ardent lumper, noting that the dimensions of the fruit given by Sargent are 13 mm for floridana and 3 mm for caroliniana and that 6 is intermediate, immediately asserts that caroliniana and floridana are conspecific and indistinguishable. But he has judged the specimen by only one character; many others should be considered.

Where there is a continuum, it is very essential that the descriptions of the recognized species correspond strictly to typical trees of the species, with no intermediates or deviatives.

To identify a specimen, a form should be made up with the organs (except the width of the bract) shown on the left side of Table 1 entered on the left side of the form. Then each organ of the specimen is

mesured--preferably an average of mesurements of several pieces of each organ--and the figure or character is entered on the form opposite the name of the organ. Then, for each organ, the figure or character on the form is compared with the figures or characters for the various taxa in Table 1, and the name of the taxon whose figure or character in Table 1 comes closest to the figure or character on the form is entered on the form. Then the whole form is perused and the taxon whose name appears the greatest number of times is recognized as the identity of the specimen.

If it should develop that there is a group of specimens with similar characters whose characters are substantially different from any taxon in Table 1, that would create a suspicion that they represent a species yet to be ascertained.

I am indebted to Delzie Demaree for specimen material of Tilia from various parts of Arkansas.

Seeds for propagation have been furnished to Harold G. Hillier of Hillier & Sons, Winchester, England.

The holotype will be deposited in the United States National Museum of Natural History, Washington, D.C., and isotypes will be deposited in the Royal Botanic Gardens, Kew, England and the herbaria of the University of Kansas at Lawrence and the University of Illinois at Urbana.

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[1]There is also a possibility that relicta represents the prototype of americana and that americana is the result of orthogenesis from the prototype. In any event, relicta and americana reflect a separation from the original type.

TABLE 1
MORPHOLOGY OF TILIA

CHARACTER	TILIA RELICTA	TILIA AMERICANA VAR. AMERICANA	TILIA CAROLINIANA VAR. CAROLINIANA	TILIA CAROLINIANA VAR. RHOOPHILA	TILIA FLORIDANA SENSU SARGENT	TILIA FLORIDANA SENSU SMALL
Bark.....	Smooth, narrowly fissured	Furrowed	Furrowed	Narrowly fissured	.....	Furrowed
Branches.....	Slender horizontal	Ascending	Ascending	Spreding	.....	.....
Last year's Branchlets	Greenish brown	Light greenish brown	Mottled greenish brown	Mottled gray	Red-brown or yellow	Red-brown or yellow
Pubescence.....	Glabrous	Glabrous	Glabrous	Densely pubescent	Glabrous	Glabrous
Length of Terminal Winter Buds mm.....	3.7	6.5	6.5	4.7	4.2	.....
Leaf Blades of Crown Leaves.....						
Thickness.....	Thin	Thin	Firm	Thin	Thin	.....
Serration.....	Serrate with short broad teeth	Serrate with broad apiculate teeth	Sharply serrate with apiculate teeth	Serrate-dentate	Coarsely serrate	Mucronate-crenate
Length cm.....	10.4	12.9	13.2	14.9	*8.8	*8.8
Width cm.....	8.6	11.3	9.2	11.4	*6.1	*6.1
Width / Length.....	.83	.88	.70	.77	*.69	*.69

Shape.....	Cordate	Cordate	Ovate	Ovate	Broadly ovate	Broadly ovate
Base.....	Cordate or obliquely cordate	Cordate or obliquely cordate	Obliquely truncate	Subcordate	Cordate or obliquely truncate	Various
Angle That the 2 Primary Veins Emerging at the Base of the Blade Make with the Midrib.....	45°	47°	29°	34°	*32°	*32°
Pubescence of Lower Surface.....	Tufts of axillary hairs	Tufts of axillary hairs	Glabrous	Hoary pubescent	Glabrate	Glabrous
Petioles of Crown Leaves..... Length cm.....	4.1	5.9	6.3	4.4	*2.3	*2.3
Length of Petiole / Length of Blade ..	.39	.46	.48	.....	*.26	*.26
Pubescence.....	Glabrous	Glabrous	Glabrous	Pubescent	Glabrous	.....
Flowers..... (Time of (Blooming	June 10 to July 10	June 20 to July 30	June 10 to July 10	.....	May 30 to--	.....
@Width mm.....	6-7	8-16	9-10	.....	.....	.....
@Hight mm.....	5-9	.....	8.5-10	.....	5-6	.....
@Sepals--Length mm...	3-3.6	5	5-7	.....	.....	.....
@Petals--Length mm...	4-5	7	6-7	.....	.....	.....
@Staminodia-Length mm	2-3	.....	5-6.5	.....	.....	.....
@Stamens--Length mm..	1-2	.....	2-4	.....	.....	.....
@Pistil--Length mm	4.6	4.5	5-7	.....	.....	.....

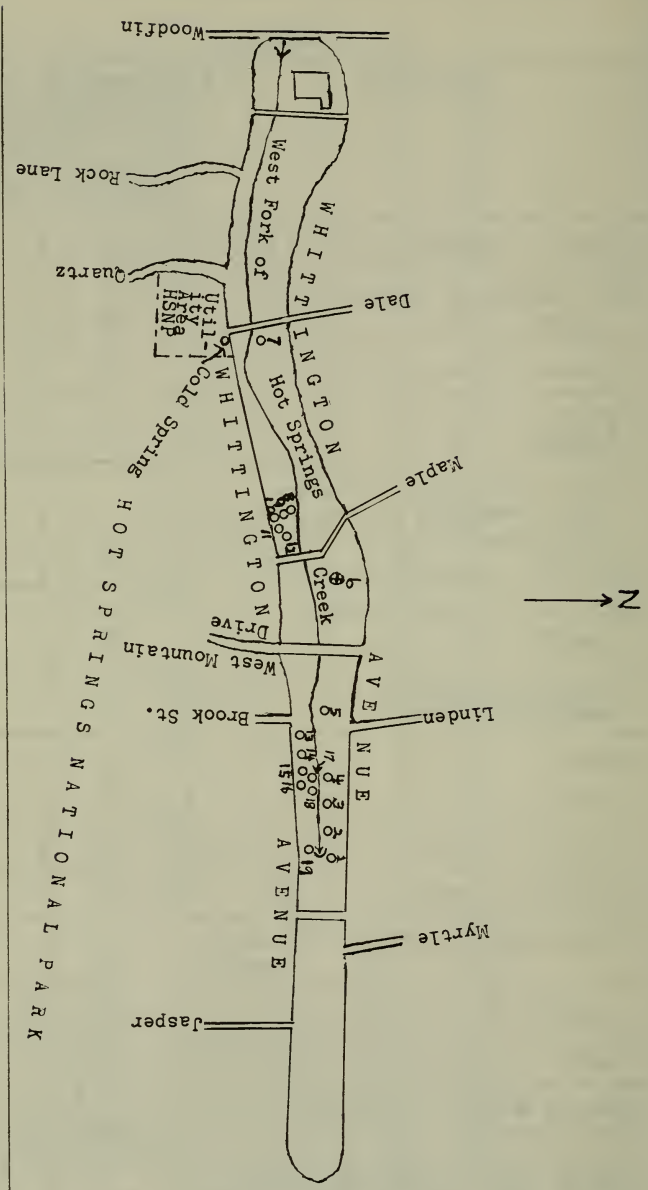
CHARACTER	TILIA RELICTA	TILIA AMERICANA VAR. AMERICANA	TILIA CAROLINIANA VAR. CAROLINIANA	TILIA CAROLINIANA VAR. RHOOPHILA	TILIA FLORIDANA SENSU SARGENT	TILIA FLORIDANA SENSU SMALL
Flowers Number of Flowers Attached to a Bract.	7-9	8	11	.....	.....	.....
Swinging Peduncle of Flowers--Length mm..	30	25	34	.....	51	30
Pubescence of Pedicels.....	Puberulous	Glabrous	Puberulous	.....	Hoary-tomentose	Hoary-tomentose
Bract.....	Glabrous	Glabrous	Glabrous	.....	Glabrous	Glabrous
Length mm	85	77	92	.....	114	120
Width mm.....	19	16	19	.....	16	18
Fruit Ripening and Usually Falling.....	July 13-Aug. 1	Sep.-Oct.	July?	.....	Aug.-Sep.	.....
@Diameter mm	5-7	6-9	3	.....	13	.....
Average Annual Increment of Circumference inches.....	.36	.57	.....	.57	.....	.....

@ Actual dimensions. All other figures are averages.

* These figures represent mesurements of leaves of an isotype of T. floridana Small from Jackson County, Florida in the herbarium of the University of Kansas and were furnished by Prof. Ronald L. McGregor.

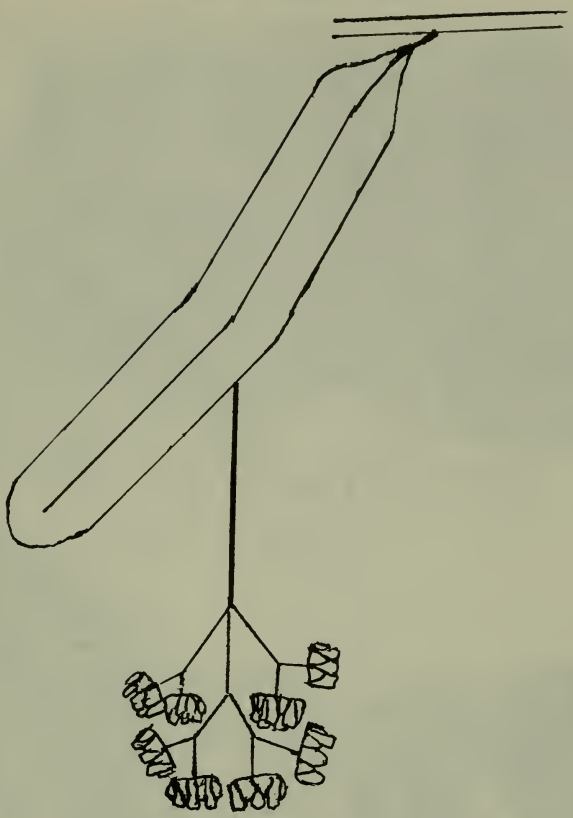
TABLE 2

CHARACTER	PERCENTAGES OF DIFFERENCES BETWEEN TILIA RELICTA AND	
	TILIA AMERICANA	TILIA FLORIDANA
Length of Terminal Winter Buds.	43	12
Leaf Blades of Crown Leaves.... Length.....	19	18
Width.....	24	41
$\frac{\text{Width}}{\text{Length}}$.....	6	20
Angle That the 2 Primary Veins Emerging at the Base of the Blade Make with the Midrib.....	4	41
Petioles of Crown Leaves Length.....	31	78
$\frac{\text{Length of Petiole}}{\text{Length of Blade}}$.....	15	50
Flowers Width.....	46	..
Sepals--Length.....	34	..
Petals--Length.....	36	..
Swinging Peduncle of Flowers Length	20	0
Length of Bract.....	10	25
Diameter of Fruit.....	20	54
Average Annual Increment of Circumference.....	37	..
TOTALS WHERE THERE ARE FIGURES ON THE SAME LINE IN BOTH COLUMNS	192	339



WHITTINGTON PARK, HOT SPRINGS, ARK.

The trees of Tilia relicta bear numbers.



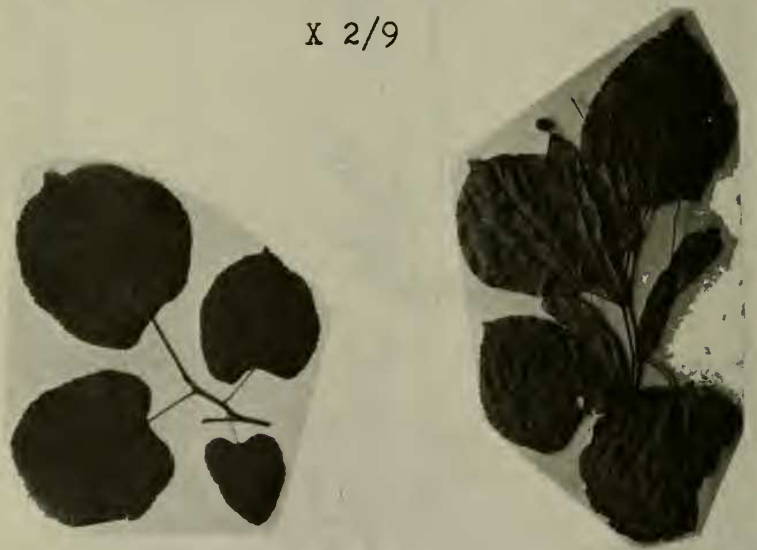
INFLORESCENCE

OF

TILIA RELICTA

X 1

LEAVES OF TILIA RELICTA #6
X 2/9



LEAVES X $\frac{1}{4}$ | X 2/9 FRUIT

TILIA RELICTA #1

FLOWERS OF
TILIA RELICTA #10

X 1/5

LEAVES OF
TILIA RELICTA #7

X 2/9

LEAVES OF TILIA RELICTA #13

X ¼

TILIA
RELICTA #6

The Monarch

Hight
111 feet
10/11/50

12/10/71
The tree in the right background is a very large Sycamore covered with Hedera helix.

8/19/71

TILIA RELICTA #6
The Monarch
Circumference 10 feet 4 inches
Hight 93 feet
346 years old

8/19/71

TILIA
RELICTA #1
The type
tree
Circumfer-
ence 4'2"

12/10/71

TILIA
RELICTA #2

Circumference
4 feet 7 inches

10/1/71
This tree was struck by lightning. Its torn off leader appears, resting on limbs.
#1 is in the left background.

9/28/70

TILIA RELICTA #17
12/10/71

TILIA
RELICTA #7
10/1/71

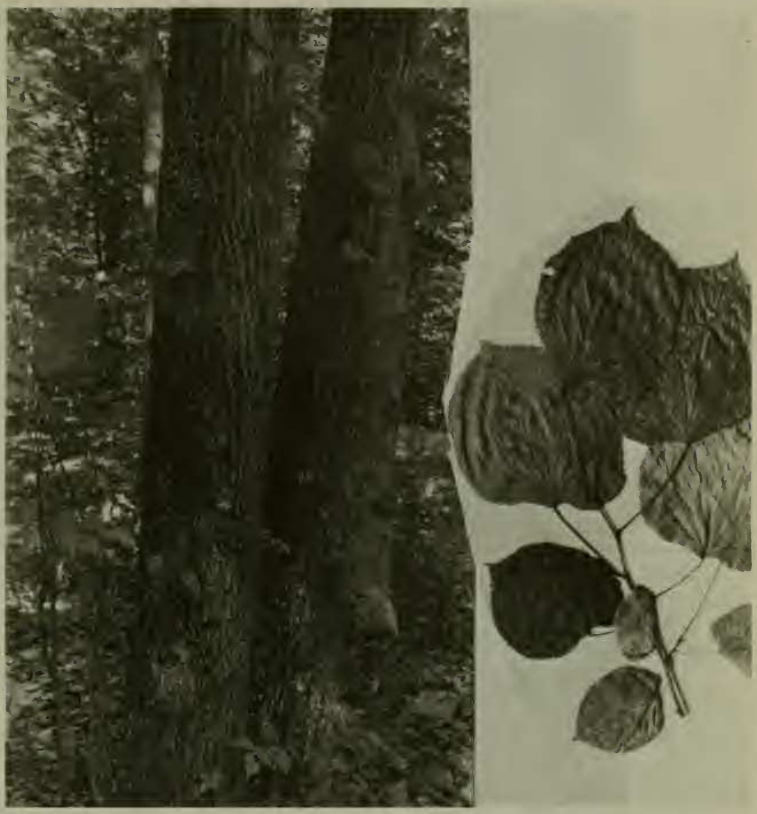
SPROUT LEAVES
OF TILIA
RELICTA #6
X ¼
6/14/71

9/16/70
TILIA AMERICANA
Circumference 8'7"
Age 156 years
Wildcat Hollow,
Swope Park,
Kansas City, Mo.

9/20/50
TILIA AMERICANA
Circumference 9'10"
The Shades State Park, Ind.

5/2/42
TILIA AMERICANA
Circumference
9 feet 4 inches

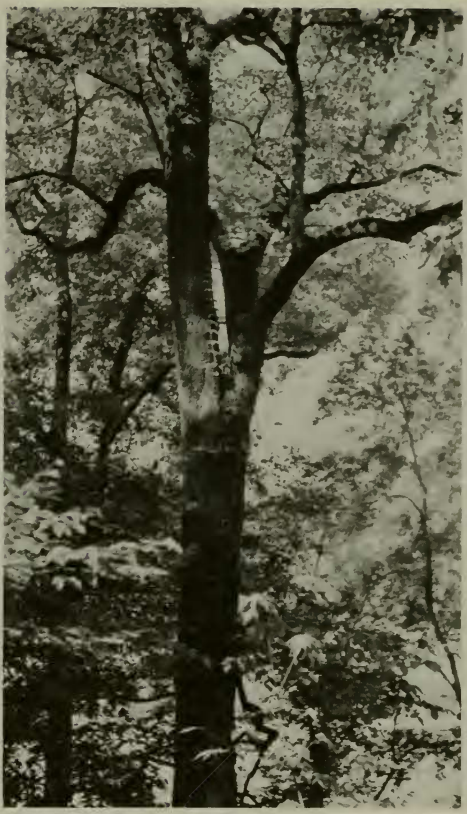
St. Paul Woods,
Morton Grove, Ill.



9/12/70 | X 2/9 6/24/71

TILIA CAROLINIANA VAR. CAROLINIANA
The left tree is the AFA champion
Circumference 3 feet 6 inches
Hight 64 feet

Bard Spring on Blaylock Creek in Polk County in the Ouachita National Forest of Arkansas



9/27/47
TILIA CAROLINIANA VAR. RHOOPHILA
Circumference 7 feet 3 inches
Hight 76 feet
West bank of Caddo River, Glenwood, Ark.
This tree was broken off in a storm in 1950.